“An analysis of the effects of oil and non-oil export shocks on the Saudi economy”

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AN ANALYSIS OF THE EFFECTS OF OIL AND NON-OIL EXPORT SHOCKS ON THE SAUDI ECONOMY

Abstract

As the world's largest oil exporter, Saudi Arabia faces the same pressures as any other government to expand its economy. Saudi Vision 2030 is to reduce the country's reliance on oil exports and revenues. One of the main goals of Saudi Vision 2030 is to increase the share of GDP that does not come from oil. Dynamic autoregressive distributed lag (ARDL) cointegration is used to look at how oil exports and exports of goods other than oil affect GDP growth. The results of the dynamic ARDL simulation show that there is both long-term and short-term cointegration between the variables. The dynamic ARDL simulation tests rely on the presence of cointegration to show that a 1% increase in oil exports will boost Saudi Arabia's economic growth by about 0.48% in the long run and 0.18% in the short run, depending on the type of time frame. In the same way, the results about non-oil exports showed that an increase in non-oil exports would boost Saudi Arabia's economic growth by 0.26 percentage points in the long run and by 0.16 percentage points in the short run. This is a good sign of Saudi Arabia's efforts to diversify its economy away from oil exports and make room for international investors to help the country reach its Vision 2030 goals.

Keywords economic growth, oil exports, non-oil exports, dynamic ARDL, cointegration

JEL Classification C01, F62, O53

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INTRODUCTION

Saudi Arabia's government has been working hard to diversify the economy so that it only depends a little on oil export products. They are doing this by taking advantage of the many mineral deposits in different parts of the country to make more than one product. The U.S. Energy Information Administration (EIA) thinks that Saudi Arabia will continue to be a significant oil producer in 2021, with 15% of the world's oil production coming from there. Rising oil prices since 2002 have led to a corresponding surge in oil exports. Regarding oil and oil products, Saudi Arabia was the world's top producer in 2010. Saudi Arabia's exports of oil helped boost the country's economy. Between 80% and 90% of Saudi Arabia's income and 40% of the country's GDP came from oil sales, according to Aljebrin (2017). The global financial crisis and the subsequent drop in oil prices stopped this steady growth in 2014. The Saudi Arabian Monetary Authority (SAMA) says that oil made up 29% of the country's GDP in 2018. This shows how dependent the country is on the commodity. In 2019, the oil industry made up 41% of the GDP, 77% of the money came from exports, and 64% went into the government's budget (Hasanov et al., 2022).

In 2015, the Paris Climate Change Commitment added pressure on Saudi Arabia. This agreement was meant to bring all countries together under a single plan to fight climate change and promote efficient

technology to lower the world's average temperature by two degrees Celsius (Aarif et al., 2022). The achievement of economic growth and maintaining that growth into the foreseeable future have been identified as one of the most critical concerns on a global scale. Saudi Arabia also emphasizes keeping its economy growing at the same rate.

Although most of Saudi Arabia's non-oil exports are tied to oil production, such as chemicals and plastics, the country's non-oil exports have grown by a factor of seven, or 12.5% a year, between 2002 and 2019. This means that the oil business still accounts for a large share of Saudi Arabia's GDP, even though the non-oil sector has developed rapidly in recent years (Hasanov et al., 2022).

Since the government, which is in charge of the country's natural resources, receives all of the revenue from oil sales, it also has complete control over how the money is spent. So, the oil industry is essential to the Saudi Arabian economy, government coffers, export earnings, and the country's ability to bring in foreign money. In order to forestall future global financial crises and the abolition of COP 21, Saudi Arabia is diversifying its economy away from oil. Since Saudi Arabia is one of the world's biggest oil exporters and is now putting its Vision 2030 plan into action to move away from an oil-based economy, this country is the main focus of our study.

1. LITERATURE REVIEW

The effects of shocks in oil prices on economic growth in nations that export more oil than they import are something that Jiménez-Rodrguez (2022) has studied. He discovered that it was beneficial for the economy. Most studies on the subject have found evidence that exporting goods like oil can be good for an economy. The excerpts below are from different research studies that shed light on this issue. Merza (2007) agreed that oil exports and economic growth are related, but he said that exports other than oil also helped Kuwait become an independent country. Al Jarrah (2008) says that Saudi Arabia's economy can only grow if it exports goods and oil. Abayomi et al. (2015) and others looked at how oil exports affected Nigeria's economy from 1970 to 2012. They wanted to discover how oil exports helped the country's economy grow during that time. The results of the co-integration test and the vector error correction model (VECM) showed that the variable under study and the explanatory variables have a link that stays the same over time. Both Baghebo and Atima (2013) and Adedokun (2012) discovered the same: oil exports and economic development go hand in hand. Abogan et al. (2014) found that between 1980 and 2010, exports of goods other than oil had a significant effect on Nigeria's economic growth. It looked at how the aggregate non-oil export statistics used in earlier research might have skewed their findings and how significant non-oil exports are for economic development. This study found that an increase in exports of goods and services other than oil had a positive effect of 29% on Nigeria's ability to produce goods and services over the period studied.

Nevertheless, exports of goods other than oil could have enormously impacted economic growth and be more encouraging. According to Kalu and Agodi's (2014) research, non-oil revenue can free up Nigeria's economy. Akeem (2011) said Nigeria's exports of goods other than oil help the economy in many ways. Between 1981 and 2010, Olurankinse and Bayo (2012) looked at the Nigerian economy. They found that Nigeria's exports of goods other than oil have yet to do as well as expected. This raises questions about how well the country's economy is promoting exports. The study shows that Nigeria's economy is still very dependent on exporting crude oil, so the crude oil sector is still an essential part of the economy. Ifeacho et al. (2014) used the ordinary least squares method to figure out the link between exports of goods other than oil and income per person. The results show a significant positive relationship between non-oil exports and per capita income. They demonstrate that increasing non-oil exports will significantly improve Nigeria's economic development. Mehrara (2014) and Adenugba and Dipo (2013) have done more research on the link between exports of goods other than oil and growth in GDP.

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Still, more research is needed on the link between GDP growth and oil and non-oil exports. Although the impact of oil and non-oil exports on GDP growth was studied by some researchers, like Mehrabadi et al. (2012), time series data were used with the VAR (vector auto-regressive) analysis method. It has been found that oil exports and exports of goods other than oil help Iran's economy grow.

Hosseini and Tang (2014) looked at the effects of oil and non-oil exports on Iran's economic growth again. They did this by using multivariate cointegration and Granger causality. The Johansen cointegration test shows that factors such as GDP growth, oil exports, and exports of goods other than oil interact stably over time. Granger causality studies, on the other hand, have shown that exporting goods other than oil and oil itself both help the economy grow. Between 1975 and 2010, Mohsen (2015) studied the effects of oil and other commodities on the Syrian economy. The cointegration test concludes that oil exports and non-oil items positively relate to GDP. In the near term, both directions are present, as shown by Granger's test for causality. Exports of oil and other commodities also impact the GDP. In addition to one-way communication, two-way dialogue is also feasible. Exports of goods other than oil have a long-term effect on GDP, but not the other way around. The results show that oil exports are the most crucial factor in GDP growth.

Mehr et al. (2012) looked at 11 oil-exporting countries to see if there was a link between government spending and income from sources other than oil. In oil-exporting countries, there was a strong link between GDP, income from sources other than oil, and government spending. Esfahani et al. (2012) centered their growth forecasting models on oil-exporting nations. The model also looked at how oil exports, inflation, the exchange rate, real foreign output, and real domestic output affect each other. After thinking about how inflation might affect the (absent) market interest rate, an output equation was made that could, in theory, be predicted. Because of this, "real money demand" became a general economic principle. They found evidence that oil exports and production overseas affect real production in the long run. If inflation reduces GDP in real terms, economic growth is subpar. The inverse correlation between inflation and the investment-output ratio supports this notion.

Aladejare and Saidi (2014) used the bound test to figure out how factors outside of the oil sector affected Nigeria's economy. Based on these results, it is clear that exports of goods other than oil significantly affect the economy's short-term and long-term growth. The results also showed that inflation and Nigeria's exchange rate or economic growth were negatively linked. The real interest rate does not significantly affect economic growth, however. In a 2014 study, Hosseini and Tang compared the effects of oil exports and other exports on economic development. Findings showed that non-oil and oil exports contributed to Iran's economic growth, but only in one direction. They also found that oil exports slowed economic growth. They suggested that other exports be pushed to get growth going and keep it going. Mehrara (2014) looked at how non-oil trade might affect the long-term and short-term economic growth of 11 oil-exporting countries. Conversely, these countries have a robust causal relationship between oil revenues and GDP.

Raheem (2016) looked at how Nigeria's gross domestic product (GDP) grew thanks to oil money and other sources of income. He discovered that oil exports have an impact on GDP in both directions. On the one hand, he found that oil exports have a unidirectional effect on GDP. On the other hand, he found that oil exports have a bidirectional effect on GDP. His research also showed that the link between non-oil industries and GDP only went in one direction. The data also showed that exports of goods other than oil had a positive relationship with economic growth, while exports had a negative relationship with economic growth. In their 2017 study on capital formation and economic growth in Nigeria, Anthony-Orji et al. found that exports of goods other than oil greatly affected both. Olayungbo and Olayemi (2018) looked into Nigeria's non-oil trade revenues, government spending, and economic growth. Both data sets showed that government spending hurts the economy, but money from sources other than oil significantly affects growth. According to what they found in their research, sources of income that were not related to oil hurt the growth of the

GDP, while government spending did the opposite.

Khayati (2019) looked into how Bahrain's growing economy is linked to its oil and other exports. He found that oil exports have a more considerable effect on short-term and long-term economic growth than other exports. In contrast, other exports have a more negligible effect on economic growth. He also said that Bahrain should speed up its efforts to diversify its economy by putting more money into developing its industrial and service sectors to increase the number of exports that are not oil. It would make the global market more efficient and productive by making it less important when oil prices change quickly.

Using the human development index (HDI), Samuel and Adedigba (2019) looked at the effects of oil and non-oil revenues on Nigeria's economic growth. Long-term correlations between the variables exist, as evidenced by the Johansen co-integration findings. Error-correction estimates demonstrate a statistically significant inverse relationship between oil revenue and the HDI. HDI is a strong predictor of non-oil revenue, but non-oil revenue is also a strong predictor of HDI. He also said that security on the high seas needs to be tightened to stop smuggling and, as a result, illegal exports of crude oil and to increase the number of goods that can be exported.

According to Aljebrin's (2017) study, non-oil exports significantly contribute to the expansion of Saudi Arabia's economy outside the oil sector immediately and over the long term. Capital investment has been critical to both countries' non-oil economic growth in the past few years. Long-term, the effects of labor on non-oil economic growth are positive and significant, but their short-term effects could be more noticeable. Research done by Alsmadi et al. (2022) shows that Saudi Arabia's economy would benefit from a more diverse group of investors. Market swings in the KSA are caused mainly by changes in the price of oil, which depend on how much oil Saudi Arabia can produce. The impact of Saudi Arabia's oil industry on the country's GDP growth during the past 47 years was studied by Al Rasasi et al. (2018). They used an error correction model whose estimation yielded long-term and short-term connections. The results of the error correction model, which said that the rise in government oil revenues "caused" the rise in private sector GDP, were confirmed by the Ganger causality test. In the end, the new non-oil activity GDP did better in output than the older non-oil private sector GDP.

Alshehri et al. (2021) say that Saudi Arabia has made much progress in areas unrelated to oil. Between 2004 and 2018, the part of the GDP that came from things other than oil grew by about 10%. This is because more things are going on in the private sector. Still, it is challenging to switch from an economy based on oil to one that does not use oil. Saudi Arabia should switch from a government-run economic and social model to a more market-based one to be more like other modern economies. Changes and reforms must be made in order to reach this goal.

Alabdulwahab (2021) looked at the relationship between oil and non-oil GDP in Saudi Arabia using autoregressive distributed lag (ARDL) cointegration. ARDL results confirm the long-term relationship between non-oil GDP and oil rent, suggesting that Saudi Arabia still uses methods to get more money from oil rent. Oil rent's effect on non-oil GDP was verified through short-term dynamics. Because of the ARDL results, researchers started looking at the possibility of asymmetrical consequences. Oil rent has an equal and opposite impact on non-oil GDP, as assessed by the NARDL model.

This study investigates the connection between gross domestic product, total exports, and oil exports. This study also looks at how the shocks of dynamic simulation in the Kingdom of Saudi Arabia affected the country's GDP, oil exports, and non-oil exports. This is accomplished by analyzing how these factors interact with each other.

2. METHODOLOGY & MODEL SPECIFICATION

This study is based on 52 observations, the sample size should be big enough to show both the short-term and long-term relationships between GDP growth, oil exports, and other exports. From 1970 to 2021, this information was sent to the Saudi Arabian Monetary Agency every year. The Khan

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et al. (2020) and Mohsen (2015) macroeconomic models were implemented. GDP is an endogenous variable in this framework, while exports of oil and other goods are exogenous.

$$Economic\ growth = \\ = f\left(oil\ \exp orts, non-oil\ \exp orts\right). \quad (1)$$

Many researchers have said that data series need to be normalized before they can be used in an econometric model. For that, all the data need to be transformed into their natural logarithms so that all of the measurements are the same, which could make the series of variables stationary and help us avoid problems with their distributional properties. This is especially true for variables like economic growth, oil exports, and non-oil exports, which are indexed with different measurement indices. That is why the data needs to be transformed into a logarithmic function so all variables can be measured as constants.

$$LY_t = \log\left(Y_t\right). \quad (2)$$

This can also be characterized in a log-linear econometric format as:

$$\ln g_t = \beta_0 + \beta_1 \ln o_t + \beta_2 \ln n_t + \varepsilon_t. \quad (3)$$

In above notation: β_0 as a constant term, β_1 as an oil export variable coefficient, β_2 as a non-oil export variable coefficient, t as a temporal time trend, and ε_t as a random error term, where ε_t assumed to be normal, identical, and independently distributed.

2.1. Cointegration method

The co-integration approach was used by Pesaran et al. (2001) to examine how the variables interact over time. The co-integration technique is referred to by its abbreviation, F-statistics. Assume that the results of the analysis indicate that the estimated value of the F-statistic is between the lower and upper bounds. In that circumstance, cointegration of the study's variables is required. Let's examine the following two hypotheses before examining the interaction of the variables:

H_0: $\theta_1 = \theta_2 = \theta_3 = 0.$

H_A: $\theta_1 \neq \theta_2 \neq \theta_3 \neq 0.$

The dynamic ARDL simulation model is used to figure out the long-term and short-term relationships between the study variables and their effects or shocks. The assessed values of the F-statistics of co-integrations show a long-term relationship between the variables under study.

$$\Delta \ln g_t = \delta_0 + \delta \ln g_{t-1} + \delta \ln o_{t-1} + \\ + \delta \ln n_{t-1} + \sum_{i=1}^{p} \beta_1 \Delta \ln g_{2t-1} + \sum_{i=1}^{q} \beta_2 \Delta \ln o_{2t-1} + \\ + \sum_{i=1}^{q} \beta_3 \Delta \ln n_{2t-1} + \varepsilon_t. \quad (4)$$

In Eq. (4), economic growth is the dependent variable, and ln*g* is the change factor. Pesaran et al. (2001) found that AIC optimal lag selection and SIC optimal lag selection worked better for small samples than other lag selection criteria. In this study, SIC represents the selection of suitable lagged variables. This study uses a simulation model like dynamic ARDL to measure the long-term and short-term effects of positive and negative shocks (exogenous variables) by stimulating and predicting the usual statistical charts used for factors outside of the economy's control.

2.2. Dynamic ARDL simulations

Jordan and Philips (2018) made a new dynamic ARDL simulation model that can be used to model the effects of positive and negative shocks on the independent and dependent variables. Insight into the connection between the factors might be gained. After finding out that the first ARDL models were based on outdated assumptions, researchers made more advanced, dynamic ARDL simulations. Dynamic ARDL, which was recently developed, analyses and forecasts statistical charts that show both negative and positive shocks in the exogenous or independent variables, assuming that all other exogenous parameters remain constant. By simulating the properties of the vector over 800 iterations based on multivariate samples drawn from the normal distribution, the size of possible positive and negative shocks can be estimated.

$$\Delta \ln g_t = \delta_0 \ln g_{t-1} + \beta_1 \ln o_t + \delta_1 \Delta \ln o_{t-1} + \\ + \beta_2 \ln n_t + \delta_2 \Delta \ln n_{t-1} + \varepsilon_t. \quad (5)$$

Equation (5) shows the simulation model for dynamic ARDL. It shows the long-run coefficients of the variables and the short-run coefficients of the used variables. ECT stands for "error correction term." ECT calculates how quickly a system returns to equilibrium after being disrupted. Also, the PP unit root and the ADF unit root are used to test whether or not the series is stationary.

3. RESULTS

The findings from the descriptive statistics are presented in Table 1. The mean value of Saudi Arabia's economic growth is about 3.81. The median, standard deviation, minimum, and maximum values are 3.85, 0.81, 1.61, and 4.79, respectively. The oil export had a minimum and maximum value of 1.02 and 4.89, respectively. The average non-oil export value is 4.17, with minimum and maximum values of 2.57 and 4.9, respectively.

Table 1. Descriptive statistics

Variables	Obs.	Mean	Median	Std. dev	Min	Max
Economic Growth	52	3.81	3.85	0.81	1.61	4.79
Oil Export	52	3.45	3.46	0.92	1.02	4.89
Non-oil Export	52	4.17	4.29	0.62	2.57	4.9

The resulting correlation matrix is displayed in Table 2. The connections between the research variables are analyzed using a correlation matrix. The correlation matrix shows that oil and non-oil exports in Saudi Arabia are positively related to economic growth.

Table 2. Correlation matrix

Variables	LNG	LNO	LNN
LNG	1	–	–
LNO	0.96	1	–
LNN	0.97	0.88	1

Checking if all of the model's variables are stationary may be done using the Philips-Perron (PP) and Augmented Dickey-Fuller (ADF) unit root tests, as shown in Table 3. That eliminates the idea that the second difference is independent of fixed factors. This would mean that results from simulations employing dynamic ARDL would be off. Exports of items other than oil have been stable, and so has economic development, according to the unit root test of PP. Contrarily, oil exports will not remain at their current level forever. Nevertheless, after the first difference, the variables remain constant. This demonstrates the viability of utilizing a time-varying ARDL in a simulation model.

The ADF unit root test also indicates that GDP growth and non-oil exports are steady at current levels. The opposite inference is derived from these findings. On the other hand, oil exports stopped changing after the first difference, which proves the first reason why a simulation model with a dynamic ARDL should be used. To satisfy this criterion, the model must capture phenomena that change over time. It was shown by Pesaran et al. (2001) that the ARDL model could be used for stationary series that were either level with the first difference or a mix of the two. The results of unit root tests on ADF

Table 3. Unit root test results

Variables		ADF			Phillips-Perron		
		LNG	LNO	LNN	LNG	LNO	LNN
At Level							
Intercept	t statistics	–3.09	–2.54	–3.53	–3.06	–2.55	–2.96
	Probability	0.034*	0.11	0.01**	0.035*	0.11	0.04*
Trend & Intercept	t statistics	–2.81	–2.9	–4.16	–2.81	–2.94	–2.35
	Probability	0.199	0.17	0.01**	0.199	0.16	0.39
At first difference							
Intercept	t statistics	–5.96	–6.68	–2.42	–5.97	–6.67	–2.57
	Probability	0.00***	0.00***	0.14	0.00***	0.00***	0.11
Trend & Intercept	t statistics	–6.28	–6.73	–2.84	–6.28	–6.71	–2.98
	Probability	0.00***	0.00***	0.19	0.00***	0.00***	0.15

Note: *, **, and *** represent 5%, 1% and 0% significance levels.

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Table 4. Bound test for ARDL

Test name	Estimated value	K	Test name	Estimated value
F-Statistics	11.56	2	t-statistics	–3.88
Level of Significance	I0	I1	I0	I1
10%	3.17	4.14	–2.57	–3.21
5%	3.79	4.85	–2.86	–3.53
2.5%	4.41	5.52	–3.13	–3.8
1%	5.15	6.36	–3.43	–4.1

Table 5. Dynamic ARDL simulations

Variables	Coef.	Std. err.	t	*P* > |*t*|
Economic Growth$_{t-1}$	–0.334	0.11	–3.03	0.004
Oil export$_{t}$	0.477	0.024	20.15	0.00
Oil export$_{t-1}$	0.179	0.0496	3.61	0.001
non-oil export$_{t}$	0.258	0.131	1.97	0.056
non-oil export$_{t-1}$	0.159	0.086	1.85	0.072
cons	0.01	0.115	0.08	0.933
R-squared		0.93		
Observation		50		
Simulations		800		
F(5,44) = 111.40		0		

and PP confirmed the series' compatibility with the dynamic ARDL simulation model, which indicated that the difference and the level were both significant.

Table 4, used to figure out ARDL limits, shows statistical evidence that the research variables are linked. The boundaries test results show a link between Saudi Arabia's GDP growth, oil exports, and exports of goods other than oil. The F- and t-statistic tests show that the estimated values are more significant than the maximum or upper bound values of 10%, 5%, and 2.5%, respectively. There was, therefore, consistent evidence of a link between the dependent and independent variables.

As a result of the simulation model with dynamic ARDL, Table 5 shows the expected values of the shocks in terms of the actual positive and negative values of the independent or exogenous variables and their effects on the endogenous variables. Variables with the letter "t" represent long-term associations, whereas variables with the letter "t – 1" show short-term relationships.

Simulations with a dynamic ARDL model show that oil exports have a large and positive effect on both short-term and long-term economic growth. Results show that in both the long and short term, a 1% increase in oil exports will boost Saudi Arabia's GDP by about 0.48 percentage points and 0.18 percentage points, respectively. Similarly, the results for non-oil exports demonstrated that diversification away from oil exports would boost Saudi Arabia's GDP by 0.26 percent in the long run and 0.16 percent in the near term.

3.1. Dynamic ARDL simulation graphs

Figure 1 shows the impact on Saudi economic growth of a 10% positive shock in oil exports and the same for 10% adverse shocks. The graph of a 10% increase in oil exports shows a positive effect on economic growth in both the short and long term, while the graphs of a 10% negative shock show that oil exports have a negative impact in both the short and long term.

Figure 2 shows the impact on Saudi economic growth of a 10% positive shock in non-oil exports and the same for 10% adverse shocks. The graph of a 10% increase in non-oil exports shows a positive effect on economic growth in both the short and long term, while the graphs of a 10% negative shock show that non-oil exports have a negative impact in both the short and long term.

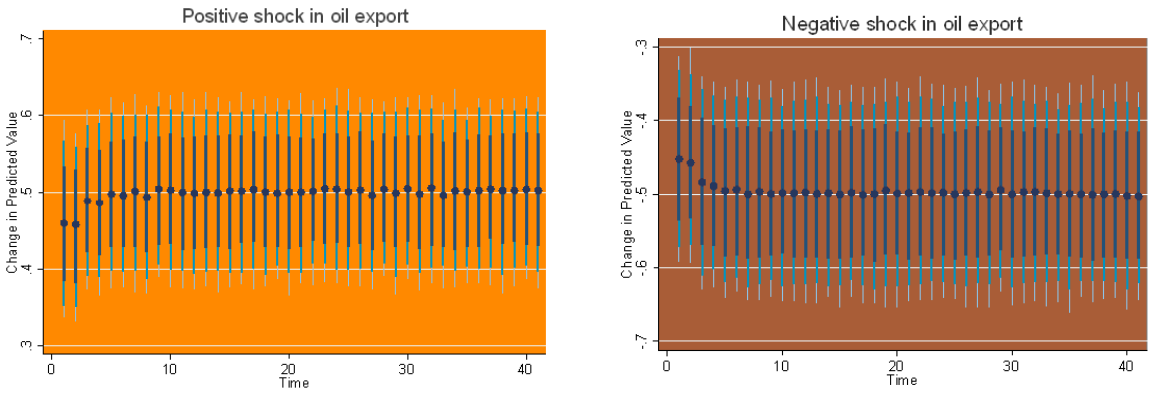

Figure 1. ± 10% shocks in oil export

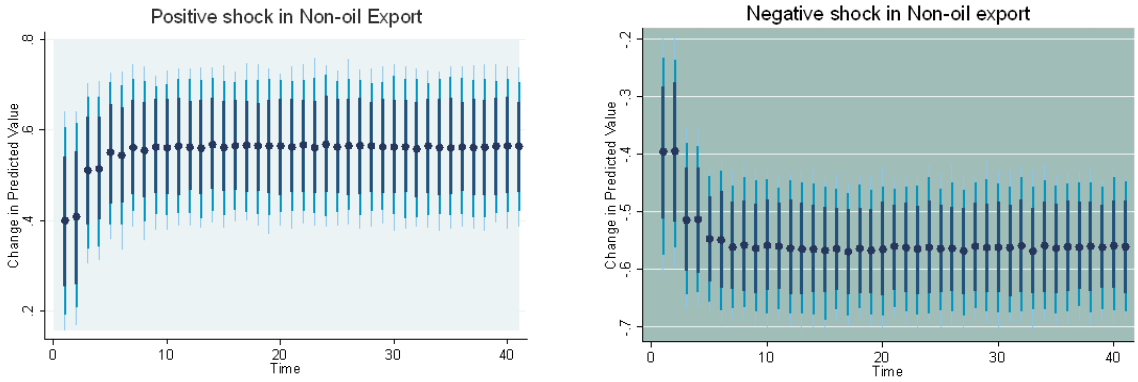

Figure 2. ± 10% shocks in non-oil export

4. DISCUSSION

Aljebrin (2017) found that non-oil exports and economic growth in Saudi Arabia were linked in a good and significant way. Using the ordinary least squares method, they found that a one percent increase in non-oil exports leads to 0.158 percent growth in the long run and 0.11 percent economic growth in the short run. Fakhri et al. (2021) say that non-oil exports and the factors that affect them suit Saudi Arabia's economy. They thought that a 1% change in the real and effective exchange rate (REER) of the Saudi riyal led to a 1.2%–1.4% change in non-oil exports from Saudi Arabia. Saudi Arabia's non-oil exports will do better in the future if the REER goes up or down more than if anything else changes.

Since oil accounts for more than half of Saudi Arabia's GDP, it is clear how the country's capacity to produce it and the price of oil influence political decisions. In the long run, the oil industry is riskier. Oil companies know what could happen if they reduce greenhouse gas emissions, contributing to global warming. Because of climate change, people and governments worldwide must find ways to get by without oil, even if they cost more. Recent moves by the Saudi government and other events show that these worries are being considered. It could take time to determine what will happen due to the expenses and hazards associated with growing manufacturing capacity. The Saudi government is turning its attention away from the oil industry and toward ventures that will draw in more international capital. The dynamic auto-regressive distributed lag model shows that a 1% rise in oil exports causes the Saudi economy to grow by 0.48% over time. As stated in its 2030 vision, the Saudi government may slowly move its economy away from relying on oil and other things. The 0.26 percent share of non-oil exports shows that this may be happening. Two more studies, by Alabdulwahab (2021) and Hasanov et al. (2022), corroborate the results of this study. Alshehri et al. (2021) say that the world will be better off if Saudi Arabia stops using oil since this will significantly cut carbon emissions.

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CONCLUSION

This study examines how Saudi Arabia's oil and non-oil exports and the country's economy impact each other, and looks into the role of oil and other exports in the current economic crisis. This study looks at the effects of Saudi Arabia's economic growth, oil exports, and other exports from 1970 to 2021 using a method called "dynamic ARDL simulations". The scope of the study spans from 1970 to 2021. A closer look at the data reveals that, while oil exports are not stationary at this level, they are at the first difference, and economic development is stagnant at both levels. The findings of the ADF unit root test, on the other hand, indicate that the level of oil exports is the first stationery rather than the level difference. The economy's growth and exports of goods other than oil have not been impacted in any manner. This makes it possible to run an ARDL simulation model in real time, which was the primary goal.

The bound test shows that the estimated F- and t-statistics are more significant than the 10%, 5%, and 2.5% upper bound values. This shows a long-term link between the dependent and independent variables of the research, and simulations using the dynamic ARDL model suggest that economic growth hurts itself by 0.34 percent in a single year. Short- and long-term oil exports significantly and favorably affect economic growth. The results show that a one percent increase in oil exports would add about 0.48 percent to Saudi Arabia's GDP in the long run and 0.18 percent in the short run. Exports of things other than oil had the same effects. An increase in non-oil exports added 0.26 percentage points to Saudi Arabia's long-term economic growth and 0.16 percentage points to its short-term growth. When accounting for non-oil exports, the 10% shock might move in either direction; however, the oil export shock remains constant across the long and short term on the simulation plots.

To reach the goals of Vision 2030, the Kingdom of Saudi Arabia has to change what it does. Instead of selling oil, the government should invest in the infrastructure that will help the private sector grow and prosper. For example, the government could make rules and laws to help the private sector grow and prosper. It could also keep an eye on how oil wealth is turned into financial investments whose returns will replace oil income and help the government provide essential services to its people efficiently and effectively.

The limitations of this study are that they only look at one country, so its results can only be used for some oil-producing countries. Second, this study focuses solely on the impact of oil and non-oil exports on the country's economic growth. It does not include other essential elements for determining a country's economic progress. In the future, studies could be done on exports that do not involve oil and how they grow, which would benefit the economy. Additionally, alternatives to oil exports might be investigated further.

AUTHOR CONTRIBUTIONS

Conceptualization: Aarif Mohammad Khan.
Data curation: Aarif Mohammad Khan.
Formal analysis: Aarif Mohammad Khan.
Investigation: Uzma Khan;
Methodology: Aarif Mohammad Khan.
Supervision: Uzma Khan.
Writing – original draft: Uzma Khan.
Writing – review & editing: Uzma Khan.

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REFERENCES

1. Abogan, O. P., Akinola, E. B., & Baruwa, O. I. (2014). Non-oil export and Economic growth in Nigeria (1980–2011). *Journal of Research in Economics and International Finance, 3*(1), 1-11. Retrieved from https://www.interesjournals.org/articles/nonoil-export-and-economic-growth-in-nigeria19802011.pdf
2. Abayomi, A., Adam, S. O., & Alumbugu, A. I. (2015). Oil Exportation and Economic Growth in Nigeria. *Developing Country Studies, 5*(15). https://core.ac.uk/download/pdf/234682516.pdf
3. Adedokun, A. J. (2012). Oil export and economic growth: descriptive analysis and empirical evidence from Nigeria. *Pakistan Journal of Social Sciences, 9*(1), 45-58.
4. Adenugba, A. A., & Dipo, S. O. (2013). Non-Oil Exports in the Economic Growth of Nigeria: A Study of Agricultural and Mineral Resources. *Journal of Educational and Social Research, 3*(2), 403-418. http://dx.doi.org/10.5901/jesr.2013.v3n2p403
5. Akeem, U. O. (2011). Non-Oil Export Determinant and Economic Growth Nigeria (1988-2008). *European Journal of Business and Management, 3*(3), 236-257. Retrieved from https://www.iiste.org/Journals/index.php/EJBM/article/view/281/163
6. Al Jarrah, M. A. (2008). Non-Oil Export Growth and Economic Development in Saudi Arabia: A Simultaneous Equations Approach. *Journal of the Gulf and Arabian Peninsula Studies, 34*(129), 25-44. Retrieved from http://search.mandumah.com/Record/663193
7. Al Rasasi, M. H., Qualls, J. H., & Alghamdi, B. K. (2018). *Oil Revenues and Economic Growth in Saudi Arabia* (SAMA Working Paper No. WP/17/8). Retrieved from https://www.sama.gov.sa/en-US/EconomicResearch/WorkingPapers/Oil%20Revenues%20and%20Economic%20Growth%20in%20Saudi%20Arabia.pdf
8. Alabdulwahab, S. (2021). The Linkage between Oil and Non-Oil GDP in Saudi Arabia. *Economies, 9*(4), 202. https://doi.org/10.3390/economies9040202
9. Aladejare, S. A., & Saidi, A. (2014). Determinants of Non-Oil Export and Economic Growth in Nigeria: An Application of the Bound Test Approach. *Journal for the Advancement of Developing Economies, 3*(1), 60-67. http://doi.org/10.13014/K2K64G89
10. Aljebrin, M. A. (2017). Impact of Non-Oil Export on Non-Oil Economic Growth in Saudi Arabia. *International Journal of Economics and Financial Issues, 7*(3), 389-397. Retrieved from https://dergipark.org.tr/tr/download/article-file/365396
11. Alshehri, A. M. N., Xianhui, G., & Shah, S. A. A. (2021). Non-oil economic transition for economic and environmental sustainability in Saudi Arabia: a multi-factor analysis under fuzzy environment. *Environmental Science and Pollution Research, 28,* 56219-56233. https://doi.org/10.1007/s11356-021-14304-8
12. Anthony-Orji, O. I., Orji, A., Ogbuador, J. E., & Nwosu, E. (2017) An Empirical Re-examination: Non-oil export, capital formation and economic growth nexus in Nigeria. *Journal of Infrastructure Development, 9*(1), 36-48. https://doi.org/10.1177/0974930617706809
13. Alsmadi, A. A., Alrawashdeh, N., Al-Gasaymeh, A., Alhwamdeh, L. N., & Al_hazimeh, A. M. (2022). Do oil prices and oil production capacity influence decision making and uncertainty in the financial market? Evidence from Saudi Arabia. *Investment Management and Financial Innovations, 19*(3). http://dx.doi.org/10.21511/imfi.19(3).2022.28
14. Baghebo, M., & Atima, T. O. (2013). The impact of petroleum on economic growth in Nigeria. *Global Business and Economics Research Journal, 2*(5), 102-115.
15. Burbidge, J., & Harrison, A. (1984). Testing for the effects of oil-price rises using vector autoregressions. *International Economic Review, 25*(2), 459-484. https://doi.org/10.1111/jeea.12029_
16. Energy Information Administration (EIA). (2021). *Country Analysis Executive Summary: Saudi Arabia.* Retrieved from https://www.eia.gov/international/content/analysis/countries_long/Saudi_Arabia/saudi_arabia.pdf
17. Esfahani, H. S., Mohaddes, K., & Pesaran, M. H. (2012). Oil Exports and the Iranian Economy. *Quarterly Review of Economics and Finance, 53*(3), 221-237. https://doi.org/10.1016/j.qref.2012.07.001
18. Esfahani, H. S., Mohaddes, K., & Pesaran, M. H. (2014). An Empirical Growth Model for Major Oil Exporters. *Journal of Applied Econometrics, 29*(1), 1-14. https://doi.org/10.1002/jae.2294
19. Gummi, M. U., Buhari, A. I., & Muhammad, A. (2017). Oil-Price fluctuations and economic growth in Nigeria: Evidence from Granger Causality Test. *Australasian Journal of Social Science, 3*(1), 1-16. https://dx.doi.org/10.3923/aujss.2017.1.16
20. Hasanov, F. J., Javid, M., & Joutz, F. (2022). Saudi Non-Oil Exports Before and After COVID-19: Historical Impacts of Determinants and Scenario Analysis. *Sustainability, 14*(4), 2379. https://doi.org/10.3390/su14042379
21. Hosseini, SMP, & Tang, C. F. (2014). The effects of oil and non-oil exports on economic growth: a case study of the Iranian economy. *Economic Research-Ekonomska Istraživanja, 27*(1), 427-441. https://doi.org/10.1080/1331677X.2014.967534
22. Ifeacho, C., Omoniyi, B. O., & Olufemi, O. B. (2014). Effects of Non-Oil Export on the Economic Development of Nigeria. *International Journal of Business and Management Invention, 3*(3), 27-32.

http://dx.doi.org/10.21511/imfi.20(1).2023.12

23. IMF. (2014). *IMF Survey: Oil Price Drop Highlights Need for Diversity in Gulf Economies*. IMF Survey. Retrieved from https://www.imf.org/en/News/Articles/2015/09/28/04/53/socar122314a

24. IMF. (2016) *Economic Diversification in Oil-Exporting Arab Countries*. Retrieved from https://www.imf.org/external/np/pp/eng/2016/042916.pdf

25. Jiménez-Rodríguez, R. (2022). Oil shocks and global economy. *Energy Economics, 115,* 106373. https://doi.org/10.1016/j.eneco.2022.106373

26. Jordan, S., & Philips, A. Q. (2018). Cointegration testing and dynamic simulations of autoregressive distributed lag models. *Stata Journal, 18*(4), 902-992. https://doi.org/10.1177/1536867X1801800409

27. Kalu, U. D., & Agodi, J. E. (2014). Investigation of the Impact of Non-Oil Revenue on Economic Growth in Nigeria. *International Journal of Science and Research, 3*(11), 2571-2577. Retrieved from https://www.ijsr.net/archive/v3i11/T0NUMTQxNTY0.pdf

28. Khan, A. M., Basit, A., Khan, U., & Khan, M. K. (2022). The Progressive Correlation Between Carbon Emission, Economic Growth, Energy Use, and Oil Consumption by the Most Prominent Contributors to Travel and Tourism GDPs. *Frontiers in Environmental Science*. https://doi.org/10.3389/fenvs.2022.945648

29. Khan, U., Khan, A. M., & Alam, S. (2020). *Exploration of the effect of oil and non-oil export on economic growth in the Kingdom of Saudi Arabia*. https://doi.org/10.21203/rs.3.rs-68487/v1

30. Khayati, A. (2019). The Effects of Oil and Non-Oil Exports on Economic Growth in Bahrain. *International Journal of Energy Economics and Policy, 9*(3), 160-164. https://doi.org/10.32479/ijeep.7476

31. Klein, N. (2010). *The Linkage between the Oil and Non-Oil Sectors – A Panel VAR Approach* (IMF Working Paper No. WP/10/118). Retrieved from https://www.imf.org/en/Publications/WP/Issues/2016/12/31/The-Linkage-between-the-Oil-and-Non-oil-Sectors-A-Panel-VAR-Approach-23827

32. Mehr, A. M., Musai, M., & Karsalari, A. R. (2012). The relationship between revenue and expenditure in oil exporting countries. *International Journal of Business and Behavioral Sciences, 2*(6). https://doi.org/10.1016/j.resourpol.2020.101659

33. Mehrabadi, M. S., Nabiuny, E., & Moghadam, H. E. (2012). Survey of Oil and Non-Oil Export Effects on Economic Growth in Iran. *Greener Journal of Economics and Accountancy, 1*(1), 8-18. Retrieved from https://zenodo.org/record/3466733/files/GJBMS1201_Mehrabadi_et_al.pdf

34. Mehrara, M. (2014). The relationship between non-oil Trade and GDP in Petroleum Exporting Countries. *International Letters of Social and Humanistic Sciences, 12,* 63-70 https://doi.org/10.18052/www.scipress.com/ILSHS.12.63

35. Merza, E. (2007). *Oil Exports, Non-Oil Exports and Economic Growth: Time Series Analysis for Kuwait (1970–2004)* (Ph.D. Thesis). Kansas State University. Retrieved from http://hdl.handle.net/2097/293

36. Mohsen, A. S. (2015). Effects of Oil and Non-Oil Exports on the Economic Growth of Syria. *Academic Journal of Economic Studies, 1*(2), 69-78. Retrieved from https://econpapers.repec.org/article/khescajes/v_3a1_3ay_3a2015_3ai_3a2_3ap_3a69-78.htm

37. Olayungbo, D. O., & Olayemi, O. F. (2018). Dynamic relationships among non-oil revenue, government spending and economic growth in an oil-producing country: Evidence from Nigeria. *Future Business Journal, 4,* 246-260. https://doi.org/10.1016/j.fbj.2018.07.002

38. Olurankinse, F., & Bayo, F. (2012) Analysis of the Impact of Non-Oil Sector on Economic Growth. *Canadian Social Science, 8*(4), 244-248. http://dx.doi.org/10.3968/j.css.1923669720120804.1222

39. Peersman, G., & Robays, I. (2012). Cross-country differences in the effects of oil shocks. *Energy Economics, 34*(5), 1532-1547. https://doi.org/10.1016/j.eneco.2011.11.010

40. Pesaran, M. H., Shin, Y., Smith, & R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Economics, 16*(3), 289-326. https://doi.org/10.1002/jae.616

41. Raheem, I. (2016). *Analysis of the Effects of Oil and Non-Oil Export on Economic Growth in Nigeria.* Retrieved from https://hal.archives-ouvertes.fr/hal-01401103v2

42. Samuel, O. S., & Adedigba, S. S. (2019). The Nexus between Oil and Non-Oil Revenue on Economic Development in Nigeria. *International Journal of Economics, Business and Management Studies, 6*(2), 355-365. http://dx.doi.org/10.20448/802.62.355.365